Remarks

Claims 8 and 11–26 remain pending in the application. Claims 9 and 10 have been canceled. In the Office action dated Apr. 17, 2006, claims 8, 9, and 14 were rejected under 35 102(b) over the disclosure of Taylor-Brown. Claims 15 and 21 were rejected under 35 USC 103(a) over the disclosure of Taylor-Brown in view of Liberto (ed.). Claims 10–13, and 16–20 were rejected under 35 USC 103(a) over the disclosure of Taylor-Brown in view of Divigalpitiya et al. Claims 22–26 were rejected under 35 USC 103(a) over the disclosure of Taylor-Brown in view of Liberto (ed.) and Divigalpitiya et al. In addition, the title was objected to as non-descriptive, and the disclosure was objected to with respect to a discussion of the grounding electrode. Claims 16 and 22 were rejected under 35 USC 112 for failing to comply with the written description requirement, and claims 10, 11, 16, 17, 18, and 21–24 were rejected as indefinite under 35 USC 112.

Claims 9–10 being canceled, claims 11–13 have been amended to depend from claim 8. The claims have been amended to remove the term "finishing step", and to refer to this step as a "further step" where applicable. The claims have been amended to use the term "layer of powdery particles" consistently.

The examiner has objected to the following description in the specification:

> The grounding electrode is in a ground potential or another predetermined potential, which deviates from the zero potential. For example, if the powdery particles are treated by a negative corona the grounding electrode may have a positive potential.

The specification is using "ground" in the broad sense of an electric potential which is held fixed, narrowly this refers to fixed at zero potential, but the specification makes quite clear that this potential may be other than zero, but acts as a ground in that the potential is maintained despite current flows into the potential. The inventor may be his own lexicographer so long as the meaning is clear. The Wikipedia http://en.wikipedia.org/wiki/Ground_(electricity) Lists a variety of references to ground from an inside surface of a Faraday cage, to a virtual ground, to an earth ground. Clearly no

violence is done to the concept of ground by specifying that it may be a potential other than zero. Thus the rejection of claim 21 is overcome.

Claims 16 and 22 have been amended to claim three rolls in conformance with the specification and the drawing, thus overcoming the new matter rejection.

In claims 11, 16, 17, 18, and 22–24 "hard" has been struck as unnecessary, although it should be understood that hard roll has a well understood meaning in the art, see for example US Pat. No. 5,816,143.

Claim 8 has been amended to distinguish over Taylor-Brown to claim a web coating device with a heated roll in nipping engagement with the electrically conducting roll having an outermost insulating surface. Claim 14 has been amended to add the step of at least partially melting a binder of the powdery particles to fix the coating powder to the web in a calender stack with the heated roll.

Claim 15 further distinguishes over claim 14 which is allowable as amended.

Claim 21 has been amended to include the step of "at least partially melting a binder of the powdery layer to fix the coating powder to the web in a calender stack comprising the grounding roll and a heated roll" which is not shown or suggested in combination with the other limitation of claim 21 by Taylor-Brown or the other art of record.

Divigalpitiya et al. discloses a method and apparatus for embedding particles in a web [0002]. Divigalpitiya et al. neither shows nor suggests a heated roll in nipping engagement with a grounding roll having an electrically insulating surface. Taylor-Brown suggests the possibility of a grounding roll having an electrically insulating surface, but indicates such an arrangement is not preferable (col. 3 lines 46–47). Taylor-Brown does not suggest a heated roll forming a nip with a grounding electrode having an outermost insulating surface. Divigalpitiya et al. at most suggests the heaters 18, 30 could be rolls and could be adjacent the top surface of the web. ¶ [0056]. Divigalpitiya et al. shows grounded heated plates 18, 46 but not a heated roll in nipping engagement with a grounded roll. The nip between the rolls 36 of Divigalpitiya et al. may be between heated rolls which it is indicated could replace the heated surface 30, but the rolls 36 are not indicated as a heated roll and a grounded roll with the

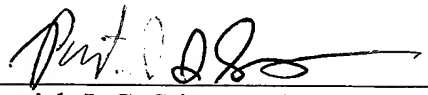
dielectric coating.

The examiner finds that Divigalpitiya et al. shows an equivalence between heating ovens and heating rolls. But this is logically insufficient. That two structures may be interchanged in a particular and quite different device is not a convincing argument that they may be interchanged with the device of Taylor-Brown. Further, Divigalpitiya et al. provides only a laundry list of possible substitutions. The examiner must provide convincing reasons or a suggestion and expectation of success contained within the references for doing what applicant has done.

Applicant has developed a new way of coating a web using the electrostatic method which employs a rotating grounding roll with the dielectric coating, which is in nipping engagement with a heated roll which fixes the coating to the web.

Applicant submits that the claims, as amended, are in condition for allowance. Favorable action thereon is respectfully solicited.

Respectfully submitted,



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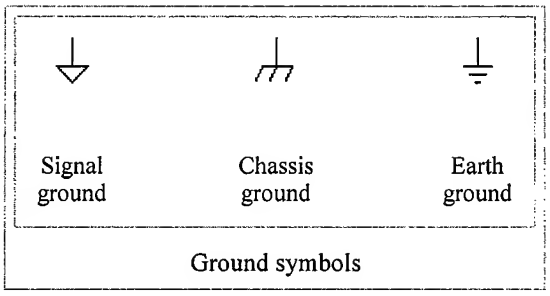
Ground (electricity)

From Wikipedia, the free encyclopedia

The term **ground** or **earth** usually means a common return path in electrical circuits. The terms **Earth return** and **ground return** are also common.

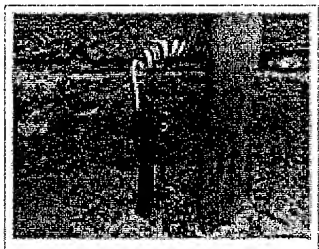


Ground symbols

Contents

Meanings

In electrical engineering, the term *ground* or *earth* has the following meanings:


A copper stake earth connection at a residential home in Australia. Note the green and yellow marked earth wire.

1. An electrical connection to earth. The part directly in contact with the earth (the *earth electrode*) can be as simple as a metal (usually copper) rod or stake driven into the earth, or a connection to buried metal water piping. Or it can be a complex system of buried rods and wires. The resistance of the electrode-to-earth connection determines its quality, and is improved by increasing the surface area of the electrode in contact with the earth, increasing the depth to which it is driven, using several connected ground rods, increasing the moisture of the soil, improving the conductive mineral content of the soil, and increasing the land area covered by the ground system. This type of *ground* applies to radio antennas and to lightning protection systems.
2. In a mains (AC power) wiring installation, the grounding is the wire that carries currents away under fault conditions. This *power ground* grounding wire is (directly or indirectly) connected to one or more earth electrodes. These may be located locally, be far away in the suppliers network or in many cases both. This *grounding wire* is usually but not always connected to the *neutral wire* at some point and they may even share a cable for part of the system under some conditions. The ground wire is also usually bonded to pipework to keep it at the same potential as the electrical ground during a fault. Water supply pipes often used to be used as ground electrodes but this was banned in some countries when plastic pipe such as PVC became popular.
3. In an electrical circuit operating at signal voltages (usually less than 50 V or so), a common return path that is the zero voltage reference level for the equipment or system. This signal ground may or may not actually be connected to a power ground. A system where the system ground is not actually connected to earth is often referred to as a *floating ground*.
4. An electrical connection to the inside surface of a Faraday cage. Any excess charges deposited on the inner surface of a Faraday cage will migrate to the outer surface of the cage, where they can produce no electric fields within the enclosure. For this reason, the inside surface of a Faraday cage behaves like an infinite sink for electrical charge from the perspective of objects within. Even if the Faraday cage itself is not connected to the Earth, the inner surface of the cage can be used in place of an earth connection.
5. A ground conductor on a lightning protection system used to dissipate the strike into the earth.

Uses

A power ground NEC (Article 250) You need to establish an effective ground-fault current path and the earth shall not be considered as an effective ground-fault current path. Ground serves to provide a return path for fault currents and therefore allow the fuse or breaker to disconnect the circuit. The power ground is also often bonded to the house's incoming pipework, and pipes and cables entering the bathroom are sometimes cross-bonded. This is done to try to reduce the voltage between objects that can be touched simultaneously. Filters also connect to the power ground, but this is mainly to stop the power ground carrying noise into the systems the filters protect, rather than a direct use of the power ground.

In Single Wire Earth Return (SWER) electrical distribution systems, costs are saved by using just a single high voltage conductor for the power grid, while routing the AC return current through the earth. This system is mostly used in rural areas where large earth currents will not otherwise cause hazards.

Signal grounds serve as return paths for signals and power at low voltages (less than about 50 V) within equipment, and on the signal interconnections between equipment. Many electronic designs feature a single return that acts as a reference for all signals.

Power and signal grounds often get connected together, usually through the metal case of the equipment.

Lightning protection is a very specialised form of grounding used in an attempt to divert the huge currents from lightning strikes.

Grounding is primarily used for safety to prevent electric shock or fires caused by a voltage potential between the earth and a conductor such as an appliance cabinet or chassis. Grounding is often used to conduct lightning strikes harmlessly to earth rather than starting fires and damaging equipment. It is also used to control electrical noise in computer, audio and video, and communications circuits. This illustrates that an *electrical ground* should have an appropriate current-carrying capability in order to serve as an adequate zero-voltage reference level.

History

Long-distance electromagnetic telegraph systems from 1820 onwards used two or more wires to carry the signal and return currents. It was then discovered, probably by the German scientist Carl August Steinheil in 1836-1837 [1] (http://www.du.edu/~jcalvert/tel/morse/morse.htm), that the ground could be used as the return path to complete the circuit, making the return wire unnecessary. However, there were problems with this system, exemplified by the transcontinental telegraph line constructed in 1861 by the Western Union Company between Saint Joseph, Missouri, and Sacramento, California. During dry weather, the ground connection often developed a high resistance, requiring water to be poured on the ground rod to enable the telegraph to work or phones to ring.

Later, when telephony began to replace telegraphy, it was found that the currents in the earth induced by power systems, electrical railways, other telephone and telegraph circuits, and natural sources including lightning caused unacceptable interference to the audio signals, and the two-wire system was reintroduced.

See also

- Domestic AC power plugs and sockets
- Earthing systems
- Ground constants
- Ground loop

- Phantom circuit
- Phantom loop
- Virtual ground
- Ground mat

Source

- Federal Standard 1037C in support of MIL-STD-188

External links

- The Electromagnetic Telegraph, by J. B. Calvert (http://www.du.edu/~jcalvert/tel/morse/morse.htm)
- Grounding for Low- and High- Frequency Circuits (http://www.analog.com/UploadedFiles/Application_Notes/55584673020828AN_345.pdf) (PDF) — Analog Devices Application Note
- An IC Amplifier User's Guide to Decoupling, Grounding, and Making Things Go Right for a Change (http://www.analog.com/UploadedFiles/Application_Notes/135208865AN-202.pdf) (PDF) — Analog Devices Application Note

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